CLAIMS

What is claimed is:

1. An integrated circuit comprising:

a programmable element located on the integrated circuit, the programmable element being coupled to a redundant circuit used to repair the integrated circuit; and

a source located on the integrated circuit, the source adapted to be operatively coupled to the programmable element and to develop a programming signal sufficient to program the programmable element to activate the redundant circuit.

2. The integrated circuit, as set forth in claim 1, wherein the integrated circuit comprises a memory device.

3. The integrated circuit, as set forth in claim 2, wherein the redundant circuit comprises a redundant row or column of memory elements.

4. The integrated circuit, as set forth in claim 1, comprising a plurality of programmable elements, each of the plurality of programmable elements being coupled to a respective redundant circuit.

5. The integrated circuit, as set forth in claim 1, wherein the programmable element comprises an antifuse.

6. The integrated circuit, as set forth in claim 1, wherein the source comprises a voltage source adapted to deliver a programming voltage.

7. The integrated circuit, as set forth in claim 6, wherein the programming voltage is higher than a supply voltage of the integrated circuit.

8. The integrated circuit, as set forth in claim 1, wherein the source comprises a flyback pump.

9. The integrated circuit, as set forth in claim 8, wherein the flyback pump comprises:

an inductance;

a control circuit coupled to the inductance to control energizing the inductance; and

an output circuit coupled to the inductance to deliver the programming signal from the inductance to the programmable element.

10. The integrated circuit, as set forth in claim 9, wherein the inductance comprises a single inductor.

11. The integrated circuit, as set forth in claim 9, wherein the inductance comprises a plurality of inductors.

12. The integrated circuit, as set forth in claim 9, wherein the control circuit comprises:

a transistor coupled to the inductance; and

a switching device coupled to the transistor to cause the transistor to allow the inductance to be energized.

13. The integrated circuit, as set forth in claim 12, wherein the switching device comprises an oscillator.

14. The integrated circuit, as set forth in claim 9, wherein the output circuit comprises a peak detector.

15. The integrated circuit, as set forth in claim 14, wherein the peak detector comprises a diode.

16. The integrated circuit, as set forth in claim 9, wherein the output circuit comprises a multiplexor adapted to deliver the programming signal to the programmable element.

17. The integrated circuit, as set forth in claim 9, wherein the inductance comprises at least one inductor having a trace having dielectric discontinuities therein.

18. An integrated circuit comprising:

a test circuit located on the integrated circuit, the test circuit operable to test a target circuit on the integrated circuit to determine whether the target circuit is to be altered;

a programmable element located on the integrated circuit, the programmable element being coupled to a secondary circuit used to repair the target circuit; and

a repair circuit comprising a source located on the integrated circuit, the source adapted develop and deliver a programming signal sufficient to program the programmable element to activate the secondary circuit in response to the test circuit indicating that the target circuit is to be altered.

19. The integrated circuit, as set forth in claim 18, wherein the integrated circuit comprises a memory device.

20. The integrated circuit, as set forth in claim 19, wherein the secondary circuit comprises a redundant row or column of memory elements.

21. The integrated circuit, as set forth in claim 18, comprising a plurality of programmable elements, each of the plurality of programmable elements being coupled to a respective secondary circuit.

22. The integrated circuit, as set forth in claim 18, wherein the programmable element comprises one of an antifuse and a fusible component.

23. The integrated circuit, as set forth in claim 18, wherein the source comprises a voltage source adapted to deliver a programming voltage.

24. The integrated circuit, as set forth in claim 23, wherein the programming voltage is higher than a supply voltage of the integrated circuit.

25. The integrated circuit, as set forth in claim 23, wherein the source comprises a flyback pump.

26. The integrated circuit, as set forth in claim 25, wherein the flyback pump comprises:

an inductance;

a control circuit coupled to the inductance to control energizing the inductance; and

an output circuit coupled to the inductance to deliver the programming signal from the inductance to the programmable element.

27. The integrated circuit, as set forth in claim 26, wherein the inductance comprises a single inductor.

28. The integrated circuit, as set forth in claim 26, wherein the inductance comprises a plurality of inductors.

29. The integrated circuit, as set forth in claim 26, wherein the control circuit comprises:

a transistor coupled to the inductance; and

a switching device coupled to the transistor to cause the transistor to allow the inductance to be energized.

30. The integrated circuit, as set forth in claim 29, wherein the switching device comprises an oscillator.

31. The integrated circuit, as set forth in claim 26, wherein the output circuit comprises a peak detector.

32. The integrated circuit, as set forth in claim 31, wherein the peak detector comprises a diode.

33. The integrated circuit, as set forth in claim 26, wherein the output circuit comprises a multiplexor adapted to deliver the programming signal to the programmable element.

34. The integrated circuit, as set forth in claim 26, wherein the inductance comprises at least one inductor having a trace having dielectric discontinuities therein.

35. A system comprising:

a processor;

a memory device operably coupled to the processor, the memory device comprising:

a programmable element located on the memory device, the programmable element being coupled to a redundant row or column used to repair the memory device; and

a source located on the memory device, the source adapted to develop and deliver a programming signal sufficient to program the programmable element to activate the redundant row or column in response to the processor indicating that a memory location of the memory device is non-functional.

36. The system, as set forth in claim 35, wherein the processor comprises a microprocessor.

37. The system, as set forth in claim 35, comprising a plurality of processors operatively coupled to the memory device.

38. The system, as set forth in claim 35, wherein the memory device comprises at least one memory controller operatively coupled to at least one memory chip.

39. The system, as set forth in claim 1, wherein the memory device comprises a plurality of programmable elements, each of the plurality of programmable elements being coupled to a respective redundant row or column.

40. The system, as set forth in claim 35, wherein the programmable element comprises an antifuse.

41. The system, as set forth in claim 35, wherein the source comprises a voltage source adapted to deliver a programming voltage.

42. The system, as set forth in claim 41, wherein the programming voltage is higher than a supply voltage of the memory device.

43. The system, as set forth in claim 35, wherein the source comprises a flyback pump.

44. The system, as set forth in claim 43, wherein the flyback pump comprises:

an inductance;

a control circuit coupled to the inductance to control energizing the inductance; and

an output circuit coupled to the inductance to deliver the programming signal from the inductance to the programmable element.

45. The system, as set forth in claim 44, wherein the inductance comprises a single inductor.

46. The system, as set forth in claim 44, wherein the inductance comprises a plurality of inductors.

47. The system, as set forth in claim 44, wherein the control circuit comprises:

a transistor coupled to the inductance; and

a switching device coupled to the transistor to cause the inductance to be energized.

48. The system, as set forth in claim 47, wherein the switching device comprises an oscillator.

49. The system, as set forth in claim 44, wherein the output circuit comprises a peak detector.

50. The system, as set forth in claim 49, wherein the peak detector comprises a diode.

51. The system, as set forth in claim 44, wherein the output circuit comprises a multiplexor adapted to deliver the programming signal to the programmable element.

52. The system, as set forth in claim 44, wherein the inductance comprises at least one inductor having a trace having dielectric discontinuities therein.

53. An integrated circuit testing apparatus comprising:

an integrated circuit;

a testing device configured to couple to the integrated circuit and to functionally test at least one target circuit of the integrated circuit, wherein the integrated circuit comprises:

a programmable element located on the integrated circuit, the programmable element being coupled to redundant circuitry used to repair the integrated circuit; and

a source located on the integrated circuit, the source adapted to be operatively coupled to the programmable element and to develop a programming signal sufficient to program the programmable element to activate the redundant circuitry in response to the testing device indicating that the target circuit is at least partially non-functional.

54. The apparatus, as set forth in claim 53, wherein the integrated circuit comprises a memory device.

55. The apparatus, as set forth in claim 54, wherein the redundant circuit comprises a redundant row or column of memory elements.

56. The apparatus, as set forth in claim 53, comprising a plurality of programmable elements, each of the plurality of programmable elements being coupled to a respective redundant circuit.

57. The apparatus, as set forth in claim 53, wherein the programmable element comprises an antifuse.

58. The apparatus, as set forth in claim 53, wherein the source comprises a voltage source adapted to deliver a programming voltage.

59. The apparatus, as set forth in claim 58, wherein the programming voltage is higher than a supply voltage of the integrated circuit.

60. The apparatus, as set forth in claim 53, wherein the source comprises a flyback pump.

61. The apparatus, as set forth in claim 60, wherein the flyback pump comprises:

an inductance;

a control circuit coupled to the inductance to control energizing the inductance; and

an output circuit coupled to the inductance to deliver the programming signal from the inductance to the programmable element.

62. The apparatus, as set forth in claim 61, wherein the inductance comprises a single inductor.

63. The apparatus, as set forth in claim 61, wherein the inductance comprises a plurality of inductors.

64. The apparatus, as set forth in claim 61, wherein the control circuit comprises:

a transistor coupled to the inductance; and

a switching device coupled to the transistor to cause the inductance to be energized.

65. The apparatus, as set forth in claim 64, wherein the switching device comprises an oscillator.

66. The apparatus, as set forth in claim 61, wherein the output circuit comprises a peak detector.

67. The apparatus, as set forth in claim 66, wherein the peak detector comprises a diode.

68. The apparatus, as set forth in claim 61, wherein the output circuit comprises a multiplexor adapted to deliver the programming signal to the programmable element.

69. The apparatus, as set forth in claim 61, wherein the inductance comprises at least one inductor having a trace having dielectric discontinuities therein.